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ABSTRACT

The purpose of this study was to determine preservice secondary biology teachers' (N=18) ability to transmit knowledge of the subject to pupils through methodologies designed to translate theory into practice. The cooperating teachers (N=12) provided data regarding abilities demonstrated by the student teachers. The student teachers utilized the same evaluation device to assess their own abilities. The self-evaluation applied by the student teachers obtained higher mean values on 12 of the 19 abilities. Higher mean values were obtained from the cooperating teacher ratings on seven abilities. The total mean value for each of the groups relative to all of the 19 mean values indicates that the student teachers tended to rate themselves slightly higher than did the cooperating teachers. With regard to the 19 abilities, cooperating teachers gave the lowest rating to transmitting subject matter to pupils; they gave the highest rating to the student teachers' knowledge of botany. The lowest mean obtained from student teachers' self-evaluation dealt with their knowledge of mycology; their highest mean related to their ability to tranmit subject matter to their students through use of models. (The bulk of this document is devoted to tables; the evaluative instruments are included.) (IAH)

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THE APPLICATION OF THEORY TO PRACTICE BY PRESERVICE SECONDARY SCHOOL BIOLOGY TEACHERS

ED347131

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The Evaluative Instruments

THE APPLICATION OF THEORY TO PRACTICE BY PRESEREVICE SECONDARY SCHOOL BIOLOGY TEACHERS

This study of preservice student teachers involved a population of 18 (n = 18) undergraduates certified to teach biology by Washburn University's teacher preparation program from the Fall Semester of 1984 through Fall Semester 1989. The respective cooperating teachers involved in the study (n = 12) provided data regarding the abilities demonstrated by the student teachers. The student teachers also provided data by using the same evaluative device designed for assessing their own abilities in the secondary school subject fields of biology.

Problem Statement

The purpose of this study was to determine the preservice secondary school biology teachers' ability to transmit knowledge of subject to students through methodologies designed to translate theory into practice. Answers were sought to the following questions:

1. What were the perceptions relative to the student teachers' knowledge of the respective subject areas in biology?
2. To what extent were different teaching methods effectively used in transmitting the subject fields to the students?
3. How successful were the student teachers in translating biological theories into practice?

Research Design

Each evaluative instrument utilized in the study was based on a rating scale of 1 to 5, with 1 indicating incompetence and 5 indicating total competence. The respondents were to check the column labeled NA if they did not observe the undergraduate in a particular competency (Appendix E).

The cooperating teachers involved in the study provided data regarding the abilities demonstrated by the student teachers. The student teachers also provided data by using the same evaluative device designed for assessing their own abilities in the subject fields of biology.

Evaluations were made by the two groups mentioned above relative to the preservice teachers' knowledge of the subject areas of botany, zoology, comparative vertebrate zoology, plant kingdom, heredity, human physiology, mycology, general ecology, and plant taxonomy. The second area of the instrument dealt with the student teachers' ability to transmit subject matter to the students by using lectures, demonstrations, models, and data analysis. The third and last part of the rating instrument measured the student teachers' ability to translate theory into practice through well designed experiments, clear procedures, well defined objectives, fully explained results, applications of the results being fully explained, and providing experiments that were meaningful to the students.

The data obtained from the above respondents at the end of student teaching was tabulated and analyzed through the

application of computer technology. The quantitative results were expressed through descriptive and inferential statistics.

It can readily be noticed that the left hand column of tables 1 through 19 (Appendix A) depicts the results obtained from the utilization of the rating scale with 1 indicating incompetence, 5 indicating total competence, and NA if the undergraduate was not observed in performing a particular competency and/or simply did not have the opportunity to demonstrate the ability specified on the rating scale. The numbers listed across the tables indicate the frequency of responses received at each of the points on the rating scale by each of the respective groups. The mean values and standard deviations pertaining to each of the competencies are listed at the bottom of each table.

The Mean and Standard Deviation

Tables 1 through 19 (Appendix A) illustrates the mean scores and standard deviations for the nineteen abilities related to teaching as represented by the student teachers from Fall Semester 1984 through Fall Semester 1989.

The Percentile Rank

In order to determine the position of each derived Mean value, the percentile rank was determined. The percentile rank shows the relative position of each case in the distribution, expressed in terms of the ordinal number corresponding to the centile interval in which the case is placed. The rank order shows the distribution of the series of assessments that have been arranged according to their relative magnitudes or positions, that is, from highest to lowest in the series.

Table 20 (Appendix B) shows the ranking of the mean values derived through the application of descriptive

statistics to the data obtained from the respondents. It can readily be noted that the highest mean values obtained from the cooperating teachers were in the area dealing with the student teachers' knowledge of the subject areas of botany (mean = 5.00) (P.R. = 97.37). This ranking was followed relatively closely by the plant kingdom (mean = 4.83) (P.R.= 92.11), plant taxonomy (mean = 4.50) (P.R.= 82.84) heredity (mean = 4.40) (P.R. = 81.58), mycology (mean = 4.33) (P.R.= 73.68), general ecology (mean = 4.33) (P.R.=73.68), and comparative vertebrate zoology (mean = 4.29) (P.R. = 65.79), and zoology (mean = 4.14) (P.R. = 60.53). The smallest mean value and percentile ranking was in human physiology (mean = 3.83) (P.R.= 28.95). A rating of 5.00 on any of the above would infer total competence. Table 18 also depicts the abilities relative to transmitting the subject to the students through the application of different teaching methods. According to the perceptions of the cooperating teachers, the strongest teaching ability was illustrated through the student teachers' use of models in transmitting the subject to the students (mean = 4.00) (P.R.= 55.26). This mean value and percentile rank was followed by the student teachers' ability to use demonstrations (mean = 3.90) (P.R. = 44.74), lectures (mean = 3.67) (P.R. = 10.53). The smallest mean value derived was relative to the use of data analysis as a teaching method for transmitting the subject to the students

(mean = 3.63) (P.R.= 2.63). In addition, Table 20 provides insights regarding the student teachers' ability to translate theory into practice. Using meaningful experiments was regarded as the student teachers' strongest ability in translating theory into practice (mean = 3.92) (P.R.= 50.00). This ability was closely followed in using well-designed projects (mean = 3.83) (P.R.= 28.95), well designed experiments (mean = 3.83) (P.R. = 28.95), clear procedures (mean = 3.83) (P.R. = 28.95), well defined objectives (mean = 3.83) (P.R. = 28.95), and full explained results (mean = 3.83) P.R. = 28.95). The smallest mean value (mean = 3.67) (P.R. = 10.53) dealt with the ability to fully explain the application of the results relative to translating the respective theories into practice.

Table 21 (Appendix C) illustrates the ranking of the mean values as related to the student teachers' self-evaluation. The mean values depict the student teachers perceiving themselves as being most knowledgeable in the subject area of general ecology (mean = 4.47) (P.R.= 92.11) and zoology (mean = 4.43) (P.R.= 86.84). Comparative vertebrate zoology also had a high mean value (4.27) (P.R.= 71.05), as did botany (mean = 4.25) (P.R.= 65.79), plant kingdom (mean = 4.14) (P.R. = 60.53). Other derived mean values were in human physiology (mean = 3.92) (P.R. = 28.95), plant taxonomy (mean = 3.90) (P.R. =

23.68), and heredity (mean = 3.75) (P.R. = 7.89). The smallest mean was relative to the student teachers' knowing the subject field of mycology (mean = 3.73) (P.R.= 2.63). Table 21 also dealt with the student teachers' ability relative to transmitting the subject to the student through the use of different teaching methods. It can readily be noticed that the highest mean value derived concerning a teaching method was through the use of models (mean = 4.50) (P.R.= 92.37). This was closely followed by the ability to transmit the subject to the student through the use of lectures (mean = 4.39) (P.R.= 81.58), and the use of demonstrations (mean = 4.33) (P.R. = 76.32). The smallest mean value was in the use of data analysis (mean = 4.13) (P.R. = 55.26).

Table 21 further shows the students teachers' ability to translate theory into practice through the use of various approaches. The use of well designed experiments (mean = 4.06) (P.R. = 44.74), well defined objectives (mean = 4.06) (P.R. = 44.74), and fully explained results (mean = 4.06) (P.R. = 44.74) had the highest mean values. These values were followed by using clear procedures (mean = 4.00) (P.R. = 34.21), fully explained applications of the results (mean = 3.88) (P.R. = 18.42) and in experiments that were meaningful to the student (mean = 3.80) (P.R. = 13.16).

A mean value of 5.00 would infer total competence in the abilities mentioned above.

The Chi-Square

Since the chi-square has been considered as either a parametric or non-parametric statistic; it is a test of significance appropriate in inferential statistics for such nominal data as head counts or frequency counts. Conceptually, a chi-square test compares the observed frequencies with the expected frequencies to determine if they are significantly different from each other.

Table 22 (Appendix D) illustrates the frequency of the evaluative responses which occurred at each level of the rating scale relative to the two groups of evaluators.

The chi-square was applied to determine the significance of the differences between the frequencies of occurrence of a rating received at each point on the rating scale (Chi-Square = 9.33). In examining the Chi-Square Table of Critical Values relative to the chi-square value of 9.33 with 4 degrees of freedom, it was specified that the score has a probability level of significance at .06. For the purposes of this study, the probability level of .05 was selected as the desired level of significance. Since the probability level .05 was selected as the level of significance, then any value greater than 5 percent would mean that the data had not obtained statistical significance. Thus, the probability is fewer than six times out of one hundred that the obtained results were due to chance or error. In other words, if the study was conducted 100 times, the same differences between the groups. would be attributed to significant differences 94 times out

of hundred. However, six times out of a hundred ($p < .06$), those differences would be attributed to chance or error.

Table 22 depicts the frequency of the evaluative responses made by the cooperating teachers and the student teachers at each level of the rating scale. This data was used in calculating the chi-square to determine the degree of significant differences in the responses made by the two groups assessing the abilities related to teaching secondary school biology.

Conclusion

The cooperating teachers involved in this study provided data regarding the teaching abilities demonstrated by the student teachers through responding to a rating scale. The student teachers also provided data by responding to the same instrument.

The self-evaluation applied by the student teachers obtained higher mean values on twelve of the nineteen abilities. Those higher mean values pertained to the preservice teachers' knowledge of zoology, human physiology, general ecology; and the ability to transmit the subject to students using lectures, demonstrations, models, and data analysis; and the ability to translate theory into practice through using well designed experiments, clear procedures, well defined objectives, fully explained results, fully explained applications, and experiments that were meaningful to the students. In comparison, there were seven instances when the highest mean values were obtained from the ratings provided by the cooperating teachers. Those respective ratings pertained to the preservice teachers' abilities as related to knowledge of botany, comparative vertebrate zoology, plant kingdom, heredity, mycology, and plant taxonomy; and the ability to transmit the subject to students using experiments meaningful to the students. The total mean value for each of the respective groups relative to all of the nineteen mean values indicate that the student teachers tended to rate themselves slightly

higher (mean = 4.12) than did the cooperating teachers (mean = 3.99) The student teachers also had a smaller standard deviation (S.D. = .84) than did the student teachers (S.D. = 1.06).

The mean values relative to the nineteen abilities ranged from the cooperating teachers' smallest mean of 3.63 relative to transmitting the subject to the students by using data analysis to their respective highest mean 5.00 pertaining to the student teachers' knowledge of botany. The lowest mean obtained from the student teachers' self-evaluation was 3.73 and it dealt with their knowledge of mycology. The student teachers' highest mean of 4.50 related to their ability to transmit their respective subject to their students through the use of models.

The rating scale applied by the respondents in this study used a scale which ranged from 1 to 5 with 1 indicating incompetence and 5 indicating total competence.

The chi-square test was applied to determine the significance of the differences between the frequencies of occurrence of a rating received at each point on the rating scale by the two groups of evaluators. The chi-square score of 9.33 was obtained with a probability level of significance at .06. Thus, the probability is fewer than six times out of one hundred that the obtained results were due to chance or error.

APPENDIX A
TABLES 1-19
THE MEAN AND STANDARD DEVIATION

TABLE 1

PART A-KNOWLEDGE OF SUBJECT AREA

QUESTION 1-KNOWLEDGE OF BOTANY

Incom-petent	Cooperating Teachers 1984-1989 N=12	Student Teachers 1984-89 N=18
1	0	0
2	0	0
3	0	1
4	0	10
5	6	5
Competent		
NA	6	2
Mean	5.00	4.25
Standard Deviation	0.00	0.58

TABLE 2

PART A-KNOWLEDGE OF SUBJECT AREA

QUESTION 2-KNOWLEDGE OF ZOOLOGY

Incom-petent	Cooperating Teachers 1984-1989 N=12	Student Teachers 1984-1989 N=18
1	0	0
2	1	0
3	1	1
4	1	6
5	4	7
Competent		
NA	5	4
Mean	4.14	4.43
Standard Deviation	1.21	0.65

TABLE 3

PART A-KNOWLEDGE OF SUBJECT AREA

QUESTION 3-KNOWLEDGE OF COMPARATIVE VERTEBRATE ZOoLOGY

Incom-petent	Cooperating Teachers 1984-1989 N=12	Student Teachers 1984-1989 N=18
1	0	0
2	1	1
3	0	2
4	2	1
5	4	7
Competent		
NA	5	7
Mean	4.29	4.27
Standard Deviation	1.11	1.10

TABLE 4

PART A-KNOWLEDGE OF SUBJECT AREA

QUESTION 4-KNOWLEDGE OF PLANT KINGDOM

Incom-petent	Cooperating Teachers 1984-1989 N=12	Student Teachers 1984-1989 N=18
1	0	0
2	0	0
3	0	2
4	1	8
5	5	4
Competent		
NA	6	4
Mean	4.83	4.14
Standard Deviation	0.41	0.66

TABLE 5

PART A-KNOWLEDGE OF SUBJECT AREA

QUESTION 5-KNOWLEDGE OF HEREDITY

Incom-petent	Cooperating Teachers 1984-1989 N=12	Student Teachers 1984-1989 N=18
1	0	0
2	0	3
3	0	2
4	3	2
5	2	5
Competent		
NA	7	6
Mean	4.40	3.75
Standard Deviation	0.55	1.29

TABLE 6

PART A-KNOWLEDGE OF SUBJECT AREA

QUESTION 6-KNOWLEDGE OF HUMAN PHYSIOLOGY

Incom-petent	Cooperating Teachers 1984-1989 N=12	Student Teachers 1984-1989 N=18
1	0	1
2	1	0
3	1	3
4	2	4
5	2	5
Competent		
NA	6	5
Mean	3.83	3.92
Standard Deviation	1.17	1.19

TABLE 7

PART A-KNOWLEDGE OF SUBJECT AREA

QUESTION 7-KNOWLEDGE OF MYCOLOGY

Incom-petent	Cooperating Teachers 1984-1989 N=12	Student Teachers 1984-1989 N=18
1	0	0
2	0	1
3	1	3
4	0	5
5	2	2
Competent		
NA	9	7
Mean	4.33	3.73
Standard Deviation	1.15	0.90

TABLE 8

PART A-KNOWLEDGE OF SUBJECT AREA

QUESTION 8-KNOWLEDGE OF GENERAL ECOLOGY

Incom-petent	Cooperating Teachers 1984-1989 N=12	Student Teachers 1984-1989 N=18
1	0	0
2	0	0
3	2	1
4	0	6
5	4	8
Competent		
NA	6	3
Mean	4.33	4.47
Standard Deviation	1.03	0.64

TABLE 9

PART A-KNOWLEDGE OF SUBJECT AREA

QUESTION 9-KNOWLEDGE OF PLANT TAXONOMY

Incom-petent	Cooperating Teachers 1984-1989 N=12	Student Teachers 1984-1989 N=18
1	0	0
2	0	0
3	1	4
4	0	3
5	3	3
Competent		
NA	8	8
Mean	4.50	3.90
Standard Deviation	1.00	0.88

TABLE 10

PART B-ABILITY TO TRANSMIT SUBJECT

QUESTION 10-ABILITY TO TRANSMIT SUBJECT TO STUDENTS USING LECTURES

Incom-petent	Cooperating Teachers 1984-1989 N=12	Student Teachers 1984-1989 N=18
1	1	0
2	1	0
3	3	1
4	3	9
5	4	8
Competent		
NA	0	0
Mean	3.67	4.39
Standard Deviation	1.30	0.61

TABLE 11

PART B-ABILITY TO TRANSMIT SUBJECT

QUESTION 11-ABILITY TO TRANSMIT SUBJECT TO STUDENTS USING DEMONSTRATIONS

Incom-petent	Cooperating Teachers 1984-1989 N=12	Student Teachers 1984-1989 N=18
1	0	0
2	2	1
3	1	1
4	3	7
5	4	9
Competent		
NA	2	0
Mean	3.90	4.33
Standard Deviation	1.20	0.84

TABLE 12

PART B-ABILITY TO TRANSMIT SUBJECT

QUESTION 12-ABILITY TO TRANSMIT SUBJECT TO STUDENTS USING MODELS

Incom-petent	Cooperating Teachers 1984-1989 N=12	Student Teachers 1984-1989 N=18
1	0	0
2	1	1
3	1	1
4	6	3
5	3	11
Competent		
NA	1	2
Mean	4.00	4.50
Standard Deviation	0.89	0.89

TABLE 13

PART B-ABILITY TO TRANSMIT SUBJECT

QUESTION 13-ABILITY TO TRANSMIT SUBJECT TO STUDENT USING PHYSICAL DATA

Incom-petent	Cooperating Teachers 1984-1989 N=12	Student Teachers 1984-1989 N=18
1	0	0
2	2	0
3	1	3
4	3	8
5	2	5
Competent		
NA	4	2
Mean	3.63	4.13
Standard Deviation	1.19	0.72

TABLE 14

PART C-ABILITY TO TRANSLATE THEORY INTO PRACTICE

QUESTION 14-ARE THE EXPERIMENTS WELL DESIGNED?

Incom-petent	Cooperating Teachers 1984-1989 N=12	Student Teachers 1984-1989 N=18
1	0	0
2	0	0
3	3	3
4	8	9
5	1	4
Competent		
NA	2	2
Mean	3.83	4.06
Standard Deviation	0.58	0.68

TABLE 15

PART C-ABILITY TO TRANSLATE THEORY INTO PRACTICE

QUESTION 15-ARE THE PROCEDURES CLEAR?

Incom-petent	Cooperating Teachers 1984-1989 N=12	Student Teachers 1984-1989 N=18
1	1	0
2	1	0
3	1	4
4	5	9
5	4	4
Competent		
NA	0	1
Mean	3.83	4.00
Standard Deviation	1.27	0.71

TABLE 16

PART C-ABILITY TO TRANSLATE THEORY INTO PRACTICE

QUESTION 16-ARE THE OBJECTIVES WELL DEFINED?

Incom-petent	Cooperating Teachers 1984-1989 N=12	Student Teachers 1984-1989 N=18
1	1	0
2	1	2
3	1	1
4	5	8
5	4	6
Competent		
NA	0	1
Mean	3.83	4.06
Standard Deviation	1.27	0.97

TABLE 17

PART C-ABILITY TO TRANSLATE THEORY INTO PRACTICE

QUESTION 17-ARE THE RESULTS FULLY EXPLAINED?

Incom-petent	Cooperating Teachers 1984-1989 N=12	Student Teachers 1984-1989 N=18
1	0	0
2	2	1
3	1	3
4	6	7
5	3	6
Competent		
NA	0	1
Mean	3.83	4.06
Standard Deviation	1.03	0.90

TABLE 18

PART C-ABILITY TO TRANSLATE THEORY INTO PRACTICE

QUESTION 18-ARE THE APPLICATIONS OF THE RESULTS FULLY EXPLAINED?

Incom-petent	Cooperating Teachers 1984-1989 N=12	Student Teachers 1984-1989 N=18
1	1	0
2	0	0
3	3	6
4	6	7
5	2	4
Competent		
NA	0	1
Mean	3.67	3.88
Standard Deviation	1.07	0.78

TABLE 19

PART C-ABILITY TO TRANSLATE THEORY INTO PRACTICE

QUESTION 19-ARE THE EXPERIMENTS MEANINGFUL TO THE STUDENTS

Incom-petent	Cooperating Teachers 1984-1989 N=12	Student Teachers 1984-1989 N=18
1	1	0
2	0	1
3	2	4
4	5	7
5	4	3
Competent		
NA	0	3
Mean	3.92	3.80
Standard Deviation	1.16	0.86

APPENDIX B
TABLE 20
THE RANKING OF MEAN VALUES DERIVED FROM THE COOPERATING TEACHERS' EVALUATION OF STUDENT TEACHERS IN THE FIELD OF BIOLOGY FROM FALL, 1984 THROUGH FALL, 1989

TABLE 20

RANKING OF MEAN VALUES DERIVED FROM THE COOPERATING TEACHERS' EVALUATION OF STUDENT TEACHERS IN BIOLOGY FROM 1984-1989

Competency of Preservice Teacher	Mean Value N=12	Percentile Rank of Mean Value
Part A- Knowledge of Subject Area:		
1. Botany	5.00	97.37
2. Zoology	4.14	60.53
3. Comparative Vertebrate Zoology	4.29	65.79
4. Plant Kingdom	4.83	92.11
5. Heredity	4.40	81.58
6. Human Physiology	3.83	28.95
7. Mycology	4.33	73.68
8. General Ecology	4.33	73.68
9 Plant Taxonomy	4.50	86.84
Part B-Ability to Transmit Subject to Students Using:		
10. Lectures	3.67	10.53
11. Demonstrations	3.90	44.74
12. Models	4.00	55.26
13. Data Analysis	3.63	2.63
Part C- Ability to Translate Theory Into Practice:		
14. Are Experiments Well Designed	3.83	28.95
15. Are Procedures Clear	3.83	28.95
16. Are Objectives Well Defined	3.83	28.95
17. Are Results Fully Explained	3.83	28.95
18. Are Applications of the Results Fully Explained	3.67	10.53
19. Are Experiments Meaningful to the Student	3.92	50.00

Scale for Mean Values: 5.00 = total competence; 1:00 = incompetence

APPENDIX C

TABLE 21

THE RANKING OF MEAN VALUES DERIVED FROM THE SELF-EVALUTION OF STUDENT TEACHERS IN THE FIELD OF BIOLOGY FROM FALL, 1984 THROUGH FALL, 1989

TABLE 21

RANKING OF MEAN VALUES DERIVED FROM THE STUDENT TEACHERS' SELF-EVALUATION IN BIOLOGY FROM 1984-1989

Competency of Preservice Teacher	Mean Value N=18	Percentile Rank of Mean Value
Part A- Knowledge of Subject Area:		
1. Botany	4.25	65.79
2. Zoology	4.43	86.84
3. Comparative Vertebrate Zoology	4.27	71.05
4. Plant Kingdom	4.14	60.53
5. Heredity	3.75	7.89
6. Human Physiology	3.92	28.95
7. Mycology	3.73	2.63
8. General Ecology	4.47	92.11
9 Plant Taxonomy	3.90	23.68
Part B-Ability to Transmit Subject to Students Using:		
10. Lectures	4.39	81.58
11. Demonstrations	4.33	76.32
12. Models	4.50	97.37
13. Data Analysis	4.13	55.26
Part C- Ability to Translate Theory Into Practice:		
14. Are Experiments Well Designed	4.06	44.74
15. Are Procedures Clear	4.00	34.21
16. Are Objectives Well Defined	4.06	44.74
17. Are Results Fully Explained	4.06	44.74
18. Are Applications of the Results Fully Explained	3.88	18.42
19. Are Experiments Meaningful to the Student	3.80	13.16

Scale for Mean Values: 5.00 = total competence; 1:00 = incompetence

APPENDIX D
TABLE 22
FREQUENCY OF RESPSONSE TO NUMERICAL POSITION ON RATING SCALE BY COOPERATING TEACHERS AND STUDENT TEACHERS

TABLE 22

FREQUENCY OF RESPONSE TO NUMERICAL POSITIONS ON RATING SCALE BY COOPERATING TEACHERS AND STUDENT TEACHERS IN BIOLOGY FROM FALL SEMESTER 1984 THROUGH FALL SEMESTER 1989

Rating Scale =	(1)	(2)	(3)	(4)	(5)
Cooperating Teachers' Frequency of Response =	5	12	23	59	63
Student Teachers' Frequency of Response =	1	11	46	119	106
Total =	6	23	69	178	169

Chi-Square = 9.33

p = <.06 level of significance

APPENDIX E
EVALUATIVE INSTRUMENTS

TEACHING FIELD: BIOLOGY
(Completed by the Cooperating Teacher)

DIRECTIONS: Rate the Student Teacher's performance on the following items. Use a scale of 1 to 5, with 1 indicating incompetence and 5 indicating total competence. Check the column labeled NA if you did not observe the student teacher in a particular competency.

A. Knowledge of subject area	1	2	3	4	5	NA
1. Botany						
2. Zoology						
3. Comparative Vertebrate Zoology						
4. Plant Kingdom						
5. Heredity						
6. Human Physiology						
7. Mycology						
8. General Ecology						
9. Plant Taxonomy						

B. Ability to transmit subject to the student using	1	2	3	4	5	NA
10. Lectures						
11. Demonstrations						
12. Models						
13. Physical Data						

C. Ability to translate theory into practice	1	2	3	4	5	NA
14. Are experiments well designed						
15. Are procedures clear						
16. Are objectives well defined						
17. Are results fully explained						
18. Are applications of the results fully explained						
19. Are experiments meaningful to the student						

TEACHING FIELD: BIOLOGY
(Completed by the Student Teacher)

DIRECTIONS: In order to evaluate your performance during student teaching, please rate your competence on the following items. Use a scale of 1 to 5, with 1 indicating incompetence and 5 indicting total competence. Check the column labeled NA if you did not perform a particular competency.

		1	2	3	4	5	NA
A.	Knowledge of subject area						
	1. Botany	___	___	___	___	___	____
	2. Zoology	___	___	___	___	___	____
	3. Comparative Vertebrate Zoology	___	___	___	___	___	____
	4. Plant Kingdom	___	___	___	___	___	____
	5. Heredity	___	___	___	___	___	____
	6. Human Physiology	___	___	___	___	___	____
	7. Mycologgy	___	___	___	___	___	____
	8. General Ecology	___	___	___	___	___	____
	9. Plant Taxonomy	___	___	___	___	___	____
B.	Ability to transmit subject to the student using	1	2	3	4	5	NA
	10. Lectures	___	___	___	___	___	____
	11. Demonstrations	___	___	___	___	___	____
	12. Models	___	___	___	___	___	____
	13. Physical Data	___	___	___	___	___	____
C.	Ability to translate theory into practice	1	2	3	4	5	NA
	14. Are experiments well designed	___	___	___	___	___	____
	15. Are procedures clear	___	___	___	___	___	____
	16 Are objectives well-defined	___	___	___	___	___	____
	17. Are results fully explained	___	___	___	___	___	____
	18. Are applications of the results fully explained	___	___	___	___	___	____
	19. Are the experiments meaningful to the student	___	___	___	___	___	____